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PATENT APPLICATION
IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of

Docket No: Q56857

Yasuyoshi YAMADA

Appln. No.: 09/435,448

Group Art Unit: 2827

Confirmation No.: 5236

Examiner: Graybill, David E.

Filed: November 22, 1999

For: **BACK ELECTRODE TYPE ELECTRONIC PART AND ELECTRONIC ASSEMBLY
WITH THE SAME MOUNTED ON PRINTED CIRCUIT BOARD**

AMENDMENT UNDER 37 C.F.R. § 1.111

Commissioner for Patents
Washington, D.C. 20231

Sir:

In response to the Office Action dated August 21, 2002, please amend the above-identified application as follows:

IN THE CLAIMS:

Please enter the following amended claims:

7. (Thrice Amended) An electronic assembly comprising:

a back electrode electronic part comprising:

a main body including a circuit, and

electrodes arranged on a back surface portion of said electronic part and connected to said circuit, wherein said electrodes are arranged into groups of electrodes at portions of the electrode arrangement;

said groups of electrodes includes said electrodes having a substantially same potential level when said circuit operates;

said electronic assembly further comprising:

a printed circuit board having substrate electrodes corresponding to said electrodes provided for said electronic part, wherein one of said substrate electrodes as a first substrate electrode is provided for each of said groups of electrodes, and said substrate electrodes as second substrate electrodes other than said first substrate electrodes are provided for said electrodes of said electronic part other than in said groups of electrodes; and

solder bumps including first solder bumps connected with said groups of electrodes and said first substrate electrodes and second solder bumps connected with said second substrate electrodes and said electrodes of said electronic part other than said groups of electrodes.

Please add the following new claims:

13. (New) A back electrode electronic part according to claim 1, wherein said group of electrodes are directly connected to said first solder bump.

14. (New) A back electrode electronic part according to claim 1, wherein said electrodes arranged for solder bumps protrude from said electronic part so as to support said solder bumps.

15. (New) A back electrode electronic part according to claim 1, wherein said electrodes arranged for solder bumps are provided on the rearmost surface of said electronic part.

16. (New) A back electrode electronic part according to claim 7, wherein said group of electrodes are directly connected to said first solder bump.

17. (New) A back electrode electronic part according to claim 7, wherein said electrodes arranged for solder bumps protrude from said electronic part so as to support said solder bumps.

18. (New) A back electrode electronic part according to claim 7, wherein said electrodes arranged for solder bumps are provided on the rearmost surface of said electronic part.

19. (New) A back electrode electronic part comprising:

at least two first electrodes positioned on a rear surface of said electronic part so as to be connected to a first solder bump;

at least one second electrode positioned on a rear surface of said electronic part so as to be connected to a second solder bump;

wherein said first solder bump has a larger lateral cross section than said second solder bump.

20. (New) A back electrode electronic part according to claim 18, wherein each of said first electrodes and second electrode are arranged in a matrix on said rear surface of said electronic part.

REMARKS

Applicant thanks the Examiner for the personal interview conducted on September 12, 2002. Claims 13 and 16 are believed to correspond with the claim language agreed upon at the interview to be patentable over the applied references, and therefore should be immediately allowable.

Status of the Application

Claims 1-20 are all the claims pending in the Application, as claims 13-20 have been added to more fully define the invention. Claims 1-12 have been rejected.

Indefiniteness Rejection of Claims 7-12 Under 35 U.S.C. § 112, Second Paragraph

The Examiner has rejected claims 7-12 as being indefinite under 35 U.S.C. § 112, second paragraph. The informalities noted by the Examiner have been corrected by amending claim 7 to read similarly to claim 1, which seems to be acceptable to the Examiner. Such a correction is for precision of language only, and by its nature is non-narrowing and therefore does not create an estoppel. Thus, withdrawal of the objection is respectfully requested.

Rejections of Claims 1 and 3-6

The Examiner has rejected claims 1 and 3-6 under 35 U.S.C. § 102(e) as being anticipated by Geffken et al. (US 6,093,630, hereinafter "Geffken"), or, in the alternative, under 35 U.S.C. § 103(a) as being unpatentable over Geffken in view of Dockerty et al. (US 5,796,169; hereinafter "Dockerty"). This rejection is respectfully traversed.

Geffken

Geffken discloses a method to fabricate a semiconductor device (see FIGS. 1-7). The device (semiconductor portion 100) consists of dielectric layers 102, 114, 130; wiring 104, 106, 108, 110 and 112; contacts 120, 122, 124, 126, 128; transition layers 160, 162 and 164; and bumps 170, 172, and 174.

Dockerty

Dockerty discloses (see FIGS. 1 and 3) copper contacts 2 of printed circuit board 1 connected via solder balls 11 to device pads 4 of integrated circuit device 3. Structural reinforcement is provided by contact 8 and pad 9, connected via support solder 6.

The Examiner's Position With Respect to Claim 1

The Examiner has taken the position that Geffken discloses "electrodes 124, 126, 128 arranged for solder bumps 172, 174 on a back surface portion of said electronic part ... wherein said electrodes are arranged in groups of electrodes 126, 128 ... and said groups of electrodes are provided for a single first solder bump 174 which is larger than second solder bumps 170, 172" (see O.A., pg. 4). However, as the Examiner concedes that "Geffken does not appear to teach literally that the first solder bump is larger than the second solder bump," (although this does not stop the Examiner from using Geffken as an anticipating reference) the Examiner has applied a secondary reference, Dockerty. The Examiner takes the position that Dockerty discloses "a first solder bump 16 is larger than second solder bumps 11" (see O.A., pg. 7).

Geffken Does Not Teach Or Suggest All Of The Features Of Claim 1

The Examiner cites contacts 126 and 128 of Geffken as somehow disclosing electrodes “on a back surface portion” of the electronic part, and that those contacts are “arranged for solder bumps” as recited in claim 1.

However, contacts 126 and 128 are clearly disclosed in Geffken as being provided underneath dielectric layer 130 and below transition layer 164. Thus, Applicants respectfully submit that these contacts are merely internal components of the circuit structure disclosed in Geffken and are not provided “on a back surface portion” of the electronic part, nor are “arranged for solder bumps” as recited in claim 1.

Specifically (*see* col. 5, lines 13-17), Geffken discloses that the last “step is to deposit a bump array on the semiconductor device, with a bump deposited on each transition layer.” Thus, Geffken clearly discloses that the complete semiconductor device consists of all of the dielectric layers 102, 114, 130, and that the only features that could be remotely read as being “on a back surface portion” of the electronic part and “arranged for solder bumps” are transition layers 160, 162 and 164.

However, it is clear that transition layers 160, 162 and 164 have a one-to-one relationship with bumps 170, 172 and 174, and therefore cannot teach or suggest that “groups of electrodes are provided for a single first solder bump,” as recited in claim 1.

In further support, Applicants respectfully submit that one of ordinary skill simply would not look to the contacts 126 and 128 as disclosing the electrodes recited in claim 1. Rather, one

of ordinary skill would look to transition layers 160, 162 and 164 as providing such features. Such an analysis is supported by the Examiner's own identification of an electrode as bonding pad 15 in Dockerty, which is clearly on the surface of device 3, and his identification of an electrode as land 25 in Higashiguchi et al. (US 5,828,128) in previous Office Actions.

Further, Applicants respectfully submit that Dockerty is no more applicable than Geffken. Dockerty teaches a one-to-one connection between contact 8 and pad 9. Specifically, there is no teaching or suggestion of any support solder 6 connecting multiple contacts 8 or pads 9. Rather, Geffken only discloses contacts 8, pads 9 and support solder 6 that are of a larger size than contacts 2, pads 4 and solder balls 11.

Therefore, Applicants respectfully submit that, because Geffken, Dockerty, or any possible combination of the references fail to provide at least the features noted above, they cannot teach or suggest all the claim limitations, and the Examiner has not established prima facie obviousness (or anticipation). Thus, Applicant respectfully requests the Examiner to withdraw the rejection of claim 1.

Additionally, Applicants respectfully submit that claims 3-6 are allowable (and all of the dependent claims 3-6, 7-18 and 20) *at least* by virtue of their dependency.

Rejections of Claims 2 and 7-12

The Examiner has rejected claims 2 and 7-12 under 35 U.S.C. § 103(a) as being unpatentable over Geffken in view of Dockerty et al. (US 5,796,169; hereinafter "Dockerty"). This rejection is respectfully traversed.

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Regarding claim 7, Applicants respectfully submit that Geffken and Dockerty are deficient in teaching or suggesting at least the electrodes “on a back surface portion” of the electronic part,” for at least the reasons discussed in relation to the similar feature recited in claim 1.

Additionally, Applicants respectfully submit that claims 2 and 8-12 are allowable, *at least* by virtue of their dependency.

New Claims

Applicant hereby adds claims 13-20 to more fully describe the invention. These claims are fully supported by at least FIGS. 4 and 5 of the instant Application.

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Conclusion

In view of the foregoing, it is respectfully submitted that claims 1-20 are allowable. Thus, it is respectfully submitted that the application now is in condition for allowance with all of the claims 1-20.

If any points remain in issue which the Examiner feels may be best resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned at the telephone number listed below.

Please charge any fees which may be required to maintain the pendency of this application, except for the Issue Fee, to our Deposit Account No. 19-4880.

Respectfully submitted,



Timothy P. Cremen
Registration No. 50,855

SUGHRUE MION, PLLC
2100 Pennsylvania Avenue, N.W.
Washington, D.C. 20037-3213
Telephone: (202) 293-7060
Facsimile: (202) 293-7860

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